

U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Penstemon scariosus* var. *albifluvis* (England) Holmgren 1984,
Penstemon albifluvis J.L. England 1982

COMMON NAME: White River penstemon, White River beardtongue

LEAD REGION: Region 6

INFORMATION CURRENT AS OF: June 2010

STATUS/ACTION

☐ Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status

☐ New candidate

☒ Continuing candidate

☐ Non-petitioned

☒ Petitioned - Date petition received: **05/11/2004**

☐ 90-day positive - FR date:

☐ 12-month warranted but precluded - FR date:

☐ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES

a) Is listing warranted (if yes, see summary of threats below)? **YES**

b) To date, has publication of a proposal to list been precluded by other higher priority listing actions? **YES**

c) We find that the immediate issuance of a proposed rule and timely promulgation of a final rule for this species was, for the preceding 12 months, and continues to be, precluded by higher priority listing actions. During the past 12 months, almost our entire national listing budget was consumed by work on various listing actions to comply with court orders and court-approved settlement agreements, meeting statutory deadlines for petition findings or listing determinations, emergency listing evaluations and determinations, and essential litigation-related, administrative, and program management tasks. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken over the past 12 months, see the discussion of "Progress on Revising the Lists," in the current CNOR which can be viewed on our Internet website (<http://endangered.fws.gov/>).

___ Listing priority change
Former LP: _6_
New LP: _9_

Date when the species first became a Candidate (as currently defined): **November 28, 1983**

___ Candidate removal: Former LP: ___

- ___ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.
- ___ U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.
- ___ F – Range is no longer a U.S. territory.
- ___ I – Insufficient information exists on biological vulnerability and threats to support listing.
- ___ M – Taxon mistakenly included in past notice of review.
- ___ N – Taxon does not meet the Act's definition of "species."
- ___ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Flowering Plants, Scrophulariaceae (Snapdragon Family)

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Colorado, Utah

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Rio Blanco County, Colorado; Uintah County, Utah

LAND OWNERSHIP: Land ownership for the species habitat is a mosaic of Federal, State of Utah, and private lands. Approximately 73% of the species' population occurs on public lands managed by the Bureau of Land Management (BLM). The remaining 27% occurs on the State of Utah and private lands (Franklin 1995, p. 2; Fitts & Fitts 2008, p. 4; 2009, p. 4.)

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BIOLOGICAL INFORMATION

Species Description

Penstemon scariosus var. *albifluvis* (White River penstemon) is an herbaceous perennial, about 15 to 50 centimeters (cm) (5.9 to 20 inches (in.)) tall, with multiple clusters of upright stems. Leaves are opposite, linear (long and very narrow) to linear-lanceolate (long and wider in the middle). Flowers are light blue to lavender blue in color. The five sepals (green outer whorl of floral parts) are 4 to 6 millimeters (mm) (0.15 to 0.23 in.) long; the corolla (inner whorl of floral parts) is composed of 5 fused petals forming a bilateral tube, with upper and lower lips, 20 to 22 mm (0.78 to 0.86 in.) long. The sterile stamen (male floral part) (staminode), characteristic of

the genus *Penstemon*, is 9 to 10 mm (0.35 to 0.39 in.) long, and the fertile stamens are 10 to 11 mm (0.39 to 0.43 in.) long, with anther sacs (pollen bearing part of the stamen) that have hairs less than the width of the sacs. The capsule (seed bearing female floral part) is 8 to 11 mm (0.31 to 0.43 in.) long, with 10 to 20 seeds, 2 mm (0.08 in.) long each (England 1982, pp. 367-368). Blooming occurs from May into early June, with seeds produced by late June (Lewinsohn and Tepedino 2005, pp. 9-11).

Taxonomy

The White River penstemon was described as a new species, *Penstemon albifluvis*, in 1982 by J. L. England (England 1982, pp. 367-368). In 1984, Holmgren redefined the taxon as a variety of *Penstemon scariosus* – *Penstemon scariosus* var. *albifluvis* (Holmgren in Cronquist et al. 1984, p. 442). *Penstemon scariosus* var. *albifluvis* has a shorter corolla (floral tube) and shorter anther hairs than typical *P. scariosus*. The basal leaf rosette in *P. s. albifluvis* is reduced and deciduous early in the growing season. In addition, the habitat of the two varieties is different and disjunct; *P. s. var. albifluvis* is endemic to low elevation oil shale barrens near the White River along the Utah-Colorado border, and typical *P. scariosus* occurs at higher elevations from the West Tavaputs and Wasatch Plateaus of central Utah.

Habitat and Life History

P. s. var. albifluvis is restricted to calcareous soils derived from oil shale barrens of the Green River Formation in the Uinta Basin of northeastern Utah and adjacent Colorado. These soils are often white or infrequently red, fine textured, shallow, and usually mixed with fragmented shale. These very dry substrates occur in lower elevations of the Uinta Basin, between 1,500 and 2,040 meters (m) (5,000 and 6,680 feet (ft)). *P. s. var. albifluvis* is found in semi barren areas associated with *Atriplex confertifolia* (shadscale), *Chrysothamnus viscidiflorus* (rabbitbrush), *Stipa hymenoides* (rice grass), *Elymus salinus* (Salina ryegrass), *Cirsium barnebyi* (Barneby's thistle), *Eriogonum ephedroides* (ephedra wild buckwheat), *Pinus edulis* (piñon pine), and *Juniperus osteosperma* (juniper) (Neese and Smith 1982, pp. 58-61).

The plant is believed to be relatively long-lived due to the presence of a woody caudex (underground stems) that can be substantial and multi-branched (Lewinsohn et al. 2005, pp. 9-11). Most plants begin to flower when the woody base reaches 3 to 4 cm (1 to 1.5 in.) (Lewinsohn et al. 2005, pp. 9-11). The species is pollinated by several bee species in the genera *Osmia*, *Ceratina*, *Anthophora*, *Dialictus*, and *Halictus*; and the wasp, *Pseudomasaris vespoides* (Lewinsohn et al. 2005, p. 15; Sibul and Yates 2006, p. 14).

Historic Range and Distribution

The historic range of *P. s. var. albifluvis* has not changed since the species was first described in 1982 (England 1982, pp. 367-368). *P. s. var. albifluvis* was first discovered along the north bank of the White River one mile upstream from the Ignacio Bridge (England 1982, p. 367). The historic range was described as occurring from east central Uintah County, Utah, to Rio Blanco County, Colorado (England 1982, p. 367).

P. s. var. albifluvis' current known range extends in an arc from Raven Ridge near the White River, west of Rangely in Rio Blanco County, Colorado, westward into southern Uintah County, Utah, to the vicinity of the Gilsonite mining ghost towns of Dragon and Rainbow in Evacuation Creek (Neese and Smith 1982, pp. 58-61; Franklin 1995, pp. 1-9; Colorado Natural Heritage Program (Colorado NHP) 2005, pp. 7-9; Utah Natural Heritage Program (Utah NHP) 2005, p. 2; Fitts & Fitts 2008, p. 11 ; 2009, p. 6). The species' potential habitat, based on surface exposures of Green River Formation oil shale barrens, occurs over a linear distance of about 30 kilometers (km) (20 miles (mi)) and encompasses an area of over 259 square km (100 sq. mi) (Cashion 1967, p. 31; Neese and Smith 1982, pp. 58-61). However, the species occupies less than 1% of the potential range, approximately 81 hectares (200 acres) (Neese and Smith 1982, pp. 58-61; Franklin 1995, pp. 1-9; Colorado NHP 2005, pp. 7-9; Utah NHP 2005 p. 2, Fitts & Fitts 2008, pp. 29-39; 2009, pp. 28-30). The Utah Natural Heritage program, with support from the BLM and State of Utah, has surveyed the most likely occurrences in Utah. Utah harbors over 90% of the species potential habitat area and considerable survey work has been completed in these areas.

Status of the Species

The status of *P. s. var. albifluvis* prior to 1982 is unknown. As of 1995, the population estimate was approximately 22,800 plants in the State of Utah, comprised of 16,630 plants occurring on land managed by the BLM Vernal District, 5,639 plants on private land, and 511 plants on state administered lands (Neese and Smith 1982, pp. 58-61; Franklin 1995, pp. 3-4). In 1998, we identified one additional location of the species in northwestern Colorado, on Raven Ridge, consisting of 2 sites of 25 individuals each (Colorado NHP 2005, p. 2).

More recent status survey reports demonstrate stable to slightly declining populations in undisturbed habitat from 2004 to 2008 (Sibul and Yates 2006, p. 7; Dodge and Yates 2009, p. 5). In 2009 a significant recruitment event occurred in the two long-term monitoring plots (one site is approximately 1 mile upstream from Ignacio, Utah, along the White River and the other plot is in the Evacuation Creek drainage near Watson, Utah) (Dodge and Yates 2009, pp. 2-4). We have identified 15 separate plant occurrences in Utah and Colorado. We define plant occurrences as a specified location where plants were counted; these occurrences do not necessarily represent a single population. Of the 14 *P. s. var. albifluvis* occurrences in Utah, 9 have over 1,000 plants each, 2 have 600-700 plants each, 2 have 100-500 plants each, and 1 on private land has an unknown number (Franklin 1995, pp. 2-4). Six of the most easterly sites in Utah were resurveyed in 2008 and 2009 (Fitts & Fitts 2008, pp. 4, 29-30; Fitts & Fitts 2009; pp. 4, 28-29) with little change in species numbers. The Colorado occurrences have not been surveyed recently.

THREATS

A. The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range

Historically, impacts to the species from energy development were largely avoided because energy development within the species' habitat was minimal. Until 2005, only 2 of 15 known occurrences (13%) had oil and gas wells located within them (U.S. Fish and Wildlife Service

(USFWS) 2005, pp. 1-4). However, the 2005 Energy Act effectively opened the entire range of the species to leasing for oil and gas development (BLM 2008a, pp. 3-36 to 3-38, 4-625; BLM 2008b, pp. 97-100, 128-132). Oil and gas development within the tar sand area, which contains the southern-most occurrence of *P. s. var. albifluvis*, is likely to increase due to the 2005 Energy Policy Act stipulations that allow oil and gas development separate from tar sands extraction in the same lease area. Lands that were unavailable for leasing for traditional oil and gas development may now be leased. Therefore, we anticipate oil and gas development may impact the species to a greater extent in the future.

The entire range of *P. s. var. albifluvis* is underlain with deposits of traditional hydrocarbon resources, primarily natural gas. The number of wells drilled, per year, in Uintah County, Utah, totaled 33 in 1993, 441 in 2004, 818 in 2008, and 380 in 2009. Since 1993, the increase is significant ($p < 0.001$) peaking in 2008 before decreasing recently in 2009. Oil production in Uintah County increased over 150% from a low of 2,637,875 barrels in 1999 to 6,700,797 barrels in 2009. Gas production increased over 1,000% from 1988 when Uintah County produced 23,971,638 MCF (1 MCF = 1,000 cu ft), to 2009 when 283,353,332 MCF were produced (Utah Division of Oil, Gas and Mining (UDOGM) 2009). Significant increases also occurred since 2004 (UDOGM 2009).

Increased traditional oil and gas energy development will result in direct and indirect effects to plants and their habitats. The overlapping area of *P. s. var. albifluvis* habitat with energy reserves, lease areas, and planned actions threatens both habitat and populations. Reduction of occupied habitat patches from habitat loss or fragmentation can result in higher extinction probabilities due to environmental, demographic, or genetic random events and effects associated with smaller sizes of remnant habitat, greater isolation from neighboring populations, and increased amounts of 'edge' habitat (Jules 1998, pp. 1649-1651; Soons 2003, pp. 76-82). Reduced connectivity of habitat patches reduces seed and pollen dispersal between habitats. Smaller and more isolated populations produce fewer seeds and pollen, and then populations attract fewer and lower diversity of seed and pollen dispersers (Paschke et al. 2002, p. 1258; Lienert 2003, pp. 62-63; Soons 2003, pp. 76-82). Regional survival of plant species is threatened by fragmentation, because it reduces connectivity and gene flow (Soons 2003, pp. 76-82). Low population numbers and fragmentation pose a threat to rare plant species' genetic potential to adapt to changing environmental conditions (Matthies et al. 2004, pp. 484-486).

At the end of 2009 (December 7, 2009), there was one producing gas well and seven applications for permits to drill gas wells within 1.6 km (1 mi) of an occurrence in Utah (UDOGM 2009; Utah NHP 2008). Future oil and gas development within *P. s. var. albifluvis* habitat is likely (BLM 2005, p. 16; 2007, Appendix E; 2008a 3-36 to 3-38). Six of the *P. s. var. albifluvis* populations (40%) are currently leased for oil and gas drilling or are within established oil and gas fields that have active oil and gas drilling and resource extraction programs (BLM 2008, p. 3-40, 3-138, 4-139 to 4-147). Another four of the species' populations are entirely on private land adjacent to Federal oil and gas lease areas (Neese and Smith 1982, p. 60; Franklin 1995, p. 6). Eight of the species' known populations (53%) are within active seismic exploration areas (BLM 2003, p. 30).

Oil shale and tar sand deposits also underlay the entire range of *P. s. var. albifluvis*. The habitat of *P. s. var. albifluvis* is a series of knolls and slopes of raw oil shale derived from the Green River geologic formation. Oil shale resources associated with the Green River formation underlie approximately 41,400 sq km (16,000 sq mi) and represent the largest known concentration of oil shale in the world (Dyni 2003, pp. 332-234, 245). *P. s. var. albifluvis* only grows directly on surface exposures of the richest oil shale bearing strata in the Parachute Creek member of the Green River formation, making the species highly vulnerable to extirpation associated with exploitation of oil shale strata (Cashion 196, p. 317; Franklin 1995, p. 7; Neese and Smith 1982, map overlay Vol. 5).

In total, 14 of 15 (92% of the total known population) *P. s. var. albifluvis* occurrences are located in high value oil shale or bituminous (tar sand) areas, comprising approximately 22,750 of the species' 22,800 individuals (99.8%) (USFWS 2005, pp. 1-4). The BLM has identified most of the *P. s. var. albifluvis* habitat (14 of 15 sites) as high potential for leasing for surface mining of oil shale (BLM 2007, Appendix E). One company currently operates a small commercial oil shale extraction operation near the range of *P. s. var. albifluvis* in Utah, and plans to expand its operation to produce 20,000 barrels of oil per day from oil shale over the next 2 years (J. Savage, House Subcommittee on Energy and Mineral Resources, June 23, 2005). As of 2010, these oil shale activities have not occurred. There are numerous methods used to extract oil from oil shale, including strip mining, sub-surface mining, and in-situ extraction (BLM 2007, pp. 2-13, 2-14, Appendix A). The richest oil shale in the Uinta Basin occurs from 0 m (0 ft) deep to 1,463 m (4,800 ft) deep (BLM 2007, A-9). All methods of development impact the integrity of the surface, with surface strip mining being the most destruction (BLM 2007, Appendix A).

Economic uncertainties of oil shale development remain in today's highly volatile energy market and raise substantial questions as to whether such extraction will become economically and environmentally viable in the foreseeable future (Bartis et al. 2005, pp. 15, 53; USFWS 2006, pp. 76032-76033). Therefore, we consider the level of threats to *P. s. var. albifluvis* populations from potential oil shale development to be too speculative to be considered a threat in short to medium term despite the direct overlap of oil shale energy resources and known species occurrences.

Uintah County proposes to reconstruct a county road in Evacuation Creek within the occupied habitat of *P. s. var. albifluvis*. This proposed activity is on private lands and will not utilize Federal Resources. This action as planned will directly affect *P. s. var. albifluvis* (Crane 2009, pers. comm.). The road reconstruction itself may result in the direct loss of relatively few individuals. However, the road improvement will likely facilitate increased energy development within the species range and consequently result in more substantial population-level impacts in the form of habitat loss, degradation and fragmentation.

To date, little off road vehicle (ORV) use has been observed within the species' range. Federal and industry personnel were increasingly utilizing ORVs in oil and gas field surveys and site location developments prior to 2008 when BLM approved its Vernal Field Office Resource Management Plan (RMP) limiting all vehicles to designated routes (BLM 2008b pp. 45-46, 133-134). This protective measure will provide indirect conservation benefits within the habitat of *P. s. var. albifluvis* (BLM 2008b, p. 129). Although specific monitoring information on the

effectiveness of this measure is not available, we are not aware of any additional loss of individuals or habitat since its implementation.

Franklin (1995, p. 6) indicated trailing by sheep as the most observed impact to *P. s. var. albifluvis*. However, the extent and effect of livestock trails, soil compaction, and potential trampling is unknown due to a lack of monitoring.

In summary, traditional oil and gas development, to date, has had little impact on the species and its habitat. However, we anticipate traditional oil and gas development within the range of the species will increase within the next 5 years. Rich oil shale resources underlie all of the known occurrences for *P. s. var. albifluvis*. Surface disturbance associated with potential oil shale development has the potential to destroy the habitat of *P. s. var. albifluvis*. However, the economic and technical uncertainties of oil shale development progressing to commercial development are significant and are not likely to occur in the near future. This development uncertainty lessens the threat to this species (Bartis et al. 2005, pp. 15, 53). The ORV use and livestock trailing and grazing may impact *P. s. var. albifluvis* individuals, but we do not know the population level impacts from these activities. Overall, we consider the present or threatened destruction, modification, or curtailment of its habitat or range to be moderate in magnitude and imminent.

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

When we added *P. s. var. albifluvis* to the list of candidate species, overutilization was not known to be a threat to this species. Since we added the species to the candidate list, except for minor collections for scientific voucher specimens to validate species inventories (Franklin 1995, p. 5; Fitts and Fitts 2009, p. 35) we have not observed any collection for any purpose. We continue to believe that overutilization is not a threat to the species.

C. Disease or Predation

P. s. var. albifluvis is palatable to wildlife and livestock. Winter sheep grazing is occurring within the species' range. Livestock leasing occurs within all populations in Utah and Colorado on BLM lands. High levels of ungulate, small mammal and insect herbivory were documented at monitoring sites established in 2004 – one near Ignacio along the White River and one near the Watson town site in the Evacuation Creek Drainage (Lewinsohn and Tepedino 2004, pp. 2-3; Lewinsohn et al. 2005, pp. 9-12; Sibul and Yates 2006, pp. 6-10; Dodge and Yates 2009, pp. 2, 4). During the drought year of 2004, there were no mature seeds produced at the Watson town site due to a combination of fruiting failure and high levels of herbivory on inflorescences and seed pods (62% herbivory within the plot) (Lewinsohn et al. 2005, pp. 2-12). Additionally, seed production at the White River site was very low and herbivory on inflorescences and seed pods was even higher than at Watson (90% herbivory within the plot) (Lewinsohn et al. 2005, pp. 2-12). In the most recent year (2009) herbivory continues but at lower rates and significant germination occurred at both monitoring sites (Dodge and Yates 2009, pp. 3, 5). However, the extent of this potential threat across the range of the species is unknown because long-term monitoring has been infrequent and not throughout the species' entire range. The species has maintained viable populations throughout its distribution. The two monitoring sites are both

lower elevation sites near bodies of water (White River and Evacuation Creek). This proximity to water also may provide a source of enhanced herbivory from riparian sites. More upland sites south of White River and east of Evacuation Creek do not show levels of herbivory as observed at the monitoring sites (Franklin 1995, p. 6; Fitts and Fitts 2009, pp. 28-30). Currently, the threat of predation by wildlife and livestock is low in magnitude and imminent.

D. The Inadequacy of Existing Regulatory Mechanisms

No Federal, state, county, or local laws or regulations specifically protect *P. s. var. albifluvis*. Its status as a candidate species and BLM special status species has provided the species some protection on BLM lands (BLM 1995, pp. 1-4; 2003, p. 16; 2005, pp. 3-89). The Federal Land Policy and Management Act requires the BLM to develop and revise land-use plans when appropriate (43 U.S.C. 1712 [a]). The BLM developed a new RMP for the Vernal Field Office to consolidate existing land-use plans and to balance use and protection of resources (BLM 2008b, p. 128). Through the RMP, the Vernal Field Office is directed to conserve and recover all special status species, including candidate species (BLM 2008b, p. 128). However, the RMP special status species goals and objectives do not legally ensure that all Federal actions do not impact *P. s. var. albifluvis*.

During oil and gas development activities that have occurred to date, the BLM has minimized impacts to the species and its habitat through incorporation of conservation measures (Specht 2005, pers. comm.). Conservation measures include moving well pad and pipeline locations to avoid direct impacts to the species. These measures have been effective particularly at the low rates of development that have occurred in the habitat to date. Increased energy development in *P. s. var. albifluvis* habitat will increase the likelihood of direct loss of individual plants, habitat loss, and fragmentation (BLM 2008a, pp. 2-10, Table 2-1-21). Impacts from habitat fragmentation may be exacerbated by site activities due to dust and loss of pollinator habitat.

Approximately 27% of the species total population occurs on State of Utah or private lands. Six sites (based on the Utah NHP's database of element occurrences) occur on private lands. Five additional sites are in areas with a combination of private or State of Utah and Federal land ownerships. Private and State of Utah lands have no regulatory authority affording protection to federally listed or candidate plant species. We know oil and gas activity is occurring within the immediate vicinity of known populations on private and state lands. These populations are not protected or monitored.

The threat presented by inadequate regulatory mechanisms is low in magnitude, but nonimminent, because the species has Special Status Species designation by the BLM. The BLM's 6840 Manual and policy mandate protection of these species so they do not trend toward endangerment.

E. Other Natural or Manmade Factors Affecting its Continued Existence

Within the range of the species, we experienced a drought during the first half of the current decade (2000-2004). Years of reduced precipitation adversely impact populations. Drought affects the species' life cycle. For example, plants observed in 2001 surveys were absent in 2002

(Torti 2003, pp. 9-10). Although the species was negatively affected by this latest drought, *P. s. var. albifluvis* is adapted to drought conditions. The species is long lived on very xeric (dry) sites with very shallow soils and no vertical development of roots. In addition, the nature of the species seed bank is unknown. It appears that reproduction is an episodic event dependant on infrequent mesic (relatively wetter) growing seasons (Dodge and Yates 2009, pp. 3-4).

Climate change is likely to affect long-term survival of native species. In the southwestern United States, including Utah and areas where *P. s. var. albifluvis* grows, temperatures have increased ~ 0.8°C (1.5°F) compared to a 1960-1979 baseline (Karl et al. 2009, p. 129). By the end of this century, temperatures are expected to warm a total of 2 to 5°C (4 to 10°F) in the Southwest (Karl et al. 2009, p. 129). Additionally, hot extremes, heat waves, and heavy precipitation will increase in frequency, with the Southwest experiencing the greatest temperature increase in the continental United States (Intergovernmental Panel on Climate Change 2007, p. 8).

Throughout *P. s. var. albifluvis*' range, precipitation is predicted to increase 10-15% in the winter and decrease 5-15% in spring and summer under the highest emissions scenario by the end of this century (Karl et al. 2009, p. 130). Fall precipitation is expected to stay the same (Karl et al. 2009, p. 130). The levels of aridity of recent drought conditions and perhaps those of the 1950s drought years will become the new climatology for the southwestern United States (Seager et al. 2007, p. 1181). In fact, much of the Southwest remains in a 10-year drought that is "the most severe western drought of the last 110 years" (Karl et al. 2009, p. 130).

Drought conditions led to a noticeable decline in survival, vigor and reproductive output of *P. s. var. albifluvis* during the drought years of 2001 through 2004 (Dodge and Yates 2009, pp. 17-19). However, high-stress areas may contain plant genotypes that are adapted to that stressor, and drought-adapted species may experience lower mortality during severe droughts (Gitlin et al. 2006, pp. 1483-1485). We believe *P. s. var. albifluvis* is a drought-adapted species, yet may be vulnerable to extreme future events.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED

Prior to 1994, the BLM funded data collection pertaining to distribution and abundance of *P. s. var. albifluvis* (Franklin 1995, pp. 1-7). The species' current status as a candidate species and BLM special status species has provided some protection on BLM lands from the limited amount of oil and gas activities that occurred prior to 2003 (BLM 1995, pp. 1-4; 2003, p. 16; 2005b, p. 38). The BLM reported that conservation measures for the species, associated with well locations, have prevented loss of individuals and the species' habitat (BLM 2003, p. 16; 2005b, p. 38). Conservation measures include moving well pad and pipeline locations to avoid direct impacts to the species. Increased energy development in *P. s. var. albifluvis* habitat will likely increase direct loss of individual plants and habitat in the future, and decrease the long-term ability to implement effective conservation measures. The BLM's RMP requires conservation measures be included for site specific projects when USFWS candidate species and other Special Status Species may be affected by Federal actions (BLM 2008b, pp. 128-132). However, there are no regulatory mandates specific to *P. s. var. albifluvis*.

SUMMARY OF THREATS

P. s. var. albifluvis is vulnerable to habitat destruction as a consequence of oil and gas drilling and field production activities within its limited habitat. This threat factor is expected to increase in the near term. Historical avoidance of oil and gas leasing in the species habitat due to concerns with extracting multiple types of hydrocarbon resources from the same land areas has slowed development of this species habitat and has indirectly, until recently, provided interim protection from energy development activities. These impediments to oil and gas leasing were removed by the 2005 Federal energy policy act. The species is a prominent feature of its sparsely vegetated habitat, as such it is heavily grazed by wildlife, including insects, small mammals and where topographically available by domestic livestock, primarily sheep during the species inactive winter growing season. Thus, grazing negatively affects the long-term survival of the species.

RECOMMENDED CONSERVATION MEASURES

Continued and expanded population monitoring is essential for the conservation of *P. s. var. albifluvis*. While the entire range of the species has been surveyed in the past, additional surveys for unknown populations should be conducted. This activity was recently reinitiated (Fitts and Fitts 2008, p. 4; 2009, p. 4). New surveys include GPS locations of all populations and accurate computer-based GIS mapping and analysis. Most importantly, BLM should continue its protection from direct impacts from energy and other development within the species' habitat.

LISTING PRIORITY

THREAT			
MAGNITUDE	IMMEDIACY	TAXONOMY	PRIORITY
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9*
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

RATIONALE FOR LISTING PRIORITY NUMBER

Magnitude: Moderate.

Federal government policies, technological advances, and economics are now in place to advance oil and gas development in areas occupied by *Penstemon scariosus* var. *albifluvis*. The level of threats to populations of the species is present due to the direct overlap of energy resources and known plant occurrences. The occupied habitat of 14 of the 15 occurrences is

within developed and expanding conventional oil and gas fields, and several wells and access roads occur within the species' range. BLM's Special Status Species policy and commitments to protect these populations in the current RMP (BLM 2008b, p. 127) lessen the extent of traditional oil and gas development impacts to this species.

Most of the species' range overlaps the most geologically prospective oil shale resources and designated special tar sand areas (BLM 2008c, pp. 11, 14, 24, 30). Although BLM has approved the RMP Amendments which allows them to lease lands for oil shale and tar sands development, we are not aware of any projects proposed ((Bartis et al. 2005, p. 53-57; BLM 2008c, entire). BLM has authorized six research and development projects to allow companies to refine the extraction and processing techniques of oil shale and tar sands (BLM 2008c, p. 1-15). None of these projects are within the range of the species (BLM 2008c, p. 2-12). We anticipate that in the future, with a better understanding of environmental impacts and technological capabilities that the research and development projects will demonstrate, this threat may become viable. At this time, we are uncertain as to when, if at all, commercial oil shale and tar sands developments will occur.

With such limited occupied habitat, any destruction, modification, or curtailment of the habitat will have a negative impact the species. BLM's Special Status Species policy and commitments to protect the species in the current RMP (BLM 2008b, p. 127) will lessen direct impacts to the species. In addition, the impacts will affect individuals but will not affect the species at a level that we would expect extinction to occur. Therefore, we conclude that a moderate threat exists toward *Penstemon scariosus* var. *albifluvis* from present and potential impacts of oil and gas field development on the species and its habitat. Therefore, we have reduced the magnitude from high to moderate given the uncertainty of oil shale and tar sands development.

Imminence: Imminent.

We previously characterized threats as nonimminent. However, as discussed above under magnitude, the greatest threat to the species comes from traditional oil and gas developments. Oil and gas development is currently occurring within the range of the species and we expect the level of development to increase (BLM 2002, pp. A-5 to A-7, Table A-4). Oil shale development remains uncertain within the species' habitat, and is not expected to be a significant factor in the foreseeable future. Given the current oil and gas development activity throughout the range of the species, these threats are now imminent.

Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed? YES.

Is Emergency Listing Warranted? NO. Potential impacts to the species are not likely to destroy occupied habitat throughout all or a significant portion of the species' range within the immediate future. If oil and gas development increases substantially throughout a significant portion of the species' range, emergency listing would be reconsidered.

DESCRIPTION OF MONITORING

A Challenge Cost Share Agreement between Red Butte Garden and the BLM, Vernal District, was established in 2003 for conducting demographic research on *P. s.* var. *albifluvis* (Lewinsohn

and Tepedino 2004, p. 1). Research and monitoring are continuing at three locations:

- one on private land in Utah (Lewinsohn et al. 2005),
- one within Federal BLM lands in Utah (Lewinsohn et al. 2005), and
- one within Federal BLM lands in Colorado (BLM 1995).

The most current information available indicates that the species' Colorado population is very small and remains static at about 50 individuals (Dawson 2005, pers. comm.). During the initial 2 years of monitoring in Utah, no individuals were recruited into the two monitored populations. In 2009, significant germination occurred at both monitored populations (Dodge and Yates 2009). However, flowering and seed set increased from 2004 to 2005 (Lewinsohn et al. 2005), decreased from 2005 to 2006 (Lewinsohn et al. 2006), then increased in 2009 (Dodge and Yates 2009). Beginning in 2008, the Utah NHP initiated a range wide survey of the species and will note the extent of localized threats to the species (Fitts and Fitts 2008, 2009). This survey is scheduled to be completed by 2012.

COORDINATION WITH STATES

The Colorado NHP based at Colorado State University, and the Utah NHP based at the Utah Division of Wildlife Resources, maintain an active database on the distribution and abundance of *P. s. var. albifluvis*. Information from these sources was incorporated into this report.

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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: *Norm E Walsh* 5/26/10
Deputy Regional Director, Fish and Wildlife Service Date

Concur: *Foran W Gould*
ACTING Director, Fish and Wildlife Service Date: October 22, 2010

Do not concur: _____
Director, Fish and Wildlife Service Date